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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/514,454	02/25/00	REIBER S	PA1118

EXAMINER	
EDMONDSON, L	
ART UNIT	**PAPER NUMBER**
1725	11

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

*U.S. GPO: 2000-473-000/44602

Office Action Summary

Application No.	Applicant(s)
09/514,454	Reiber et al.
Examiner	**Group Art Unit**
Lynne Edmondson	1725

☒ Responsive to communication(s) filed on *Dec 11, 2000* .

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire *3* month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) *1-45* is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) *1-8, 10-29, and 31-44* is/are rejected.

☒ Claim(s) *9, 30, and 45* is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____ .

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____ .

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). *6*

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

DETAILED ACTION

Election/Restriction

1. Applicant's election with traverse of in Paper No. 11 is acknowledged. The restriction requirement is withdrawn.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

2. Claims 1, 3, 10, 19, 24, 32 and 39 are rejected under 35 U.S.C. 102(b) as being anticipated by Elwood et al. (USPN 5217154).

Elwood teaches a bonding tool formed of a stiff and abrasive material such as tungsten carbide with diamond (col 2 lines 44-58 and col 3 lines 12-22) other known, typically used materials are titanium carbide and ceramics (col 1 lines 51-63). See Elwood claims 1-3.

3. Claims 1, 2, 10, 11, 19, 23, 37 and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Matcovich et al. (USPN 4315128).

Matcovich teaches a bonding tool with a dense alumina tip (col 3 lines 46-61). Tool resistance is 10^2 to 10^6 ohm per square (col 5 lines 1-6). Note that in figures 3 and 10, dissipative material (23) surrounds a conductor (22) which surrounds an insulating core (10).

4. Claims 1, 4-8, 10, 19, 23, 25-29, 32-34, 37 and 39-44 are rejected under 35 U.S.C. 102(e) as being anticipated by Hadar et al. (USPN 5931368).

Hadar teaches a bonding tool of hard, abrasive material with a diamond or ceramic coating among other materials including silicon carbide, tungsten carbide and boron nitride Boron and other materials may be applied as surface layers by sputtering (col 4 lines 14-25). In one example the core is alumina (insulator) with a silicon carbide coating (col 5 lines 38-50) to which dopants may be introduced (col 6 lines 37-43). In another example, the core is tungsten carbide with a diamond, alumina, or silicon carbide coating (col 5 line 56 - col 6 line 10).

5. Claims 1-4, 10, 19-21, 23, 24, 32, 35 and 37-39 are rejected under 35 U.S.C. 102(e) as being anticipated by Linn (USPN 5816472).

Linn teaches a bonding tool made of aluminum oxide (col 2 lines 57-61) and that hard abrasive prior art tools have been made of ceramic, diamond, or alloy tools over which diamond or sapphire is coated (col 2 lines 19-28). The tool is made by known molding and sintering

processes employing non-metallic binders and is machined (col 3 lines 54-65). See Linn claims 1-3.

6. Claims 1-4, 10, 19, 23, 24, 29, 32, 39 and 40 are rejected under 35 U.S.C. 102(e) as being anticipated by Razon et al. (USPN 6073827).

Razon teaches a bonding tool made of a hard, abrasive material such as alumina, ruby, or tungsten carbide (col 4 lines 16-47 and lines 65-67). See Razon claims 7, 9 and 12.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 4, 5, 25, 26, 33, 34, 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elwood et al. (USPN 5217154) in view of Omori et al. (USPN 4502983).

Elwood teaches a bonding tool formed of a stiff and abrasive material such as tungsten carbide with diamond (col 2 lines 44-58 and col 3 lines 12-22) other known, typically used materials are metal carbides and ceramics (col 1 lines 51-63). See Elwood claims 1-3. Although

metal carbides and tool steel alloys are disclosed, there is no disclosure of a silicon carbide material doped with boron.

Omori teaches a silicon carbide material doped with boron (col 6 lines 48-60) to form a strong, stiff material used for a variety of tools and electronic applications. Note that the material resistance is 10^{11} ohm-cm (col 11 lines 1-22). See Omori claim 4 where it is taught that this material exhibits semiconducting properties. The material is formed by standard powder metallurgy techniques, such as mixing, molding and sintering (col 5 lines 6-16) and hot pressing (col 7 lines 1-5) to produce a surface layer by physical deposition..

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ the semiconductor material (which would have a resistance in the range 10 to 10^{12}) to enhance wear and abrasion resistance, while decreasing stress at the tip. Thereby increasing productivity and bond quality (Elwood, col 1 lines 62-68).

8. Claims 4-8, 20, 21, 26-29, 31, 33-35 and 42-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Matcovich et al. (USPN 4315128) in view of Omori et al. (USPN 4502983).

Matcovich teaches a bonding tool with a dense alumina tip (col 3 lines 46-61). Tool resistance is 10^2 to 10^6 ohm per square (col 5 lines 1-6). Note that in figures 3 and 10, dissipative material (23) surrounds a conductor (22) which surrounds an insulating core (10). However, there is no disclosure of the dissipative material being a semiconductor or of boron implantation.

Omori teaches a silicon carbide material doped with boron (col 6 lines 48-60) to form a strong, stiff material used for a variety of tools and electronic applications. Note that the material resistance is 10^{11} ohm-cm (col 11 lines 1-22). See Omori claim 4 where it is taught that this material exhibits semiconducting properties.

It would have been obvious to one of ordinary skill in the art to surround the conductive core (22) of the bonding tip with a semiconductor material to control heating of the tool (Matcovich, col 1 lines 35-40) without introducing a current to the device being bonded (Matcovich, col 2 lines 35-38) in a convenient and controlled manner (Matcovich, col 2 lines 45-53).

9. Claims 12-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matcovich et al. (USPN 4315128) in view of Chatterjee et al. (USPN 5827470).

Matcovich teaches a bonding tool with a dense alumina tip (col 3 lines 46-61). Tool resistance is 10^2 to 10^6 ohm per square (col 5 lines 1-6). Although ceramics are taught, there is no disclosure of a combination of alumina and zirconia.

Chatterjee teaches a hard alumina-zirconia material for tools with high wear and abrasion resistance (col 3 lines 30-47) having 5-50% alumina and therefore 50-95% zirconia (col 5 lines 43-50). See also col 6 lines 5-9.

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ dense zirconia and alumina as the tool material for reliability and extended life (Matcovich, col 2 lines 17-23).

10. Claims 22 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hadar et al. (USPN 5931368) in view of Hajaligol et al. (USPN 6030472).

Hadar teaches a bonding tool of hard, abrasive material with a diamond or ceramic coating among other materials including silicon carbide, tungsten carbide and boron nitride Boron and other materials may be applied as surface layers by sputtering (col 4 lines 14-25). In one example the core is alumina (insulator) with a silicon carbide coating (col 5 lines 38-50) to which dopants may be introduced (col 6 lines 37-43). In another example, the core is tungsten carbide with a diamond, alumina, or silicon carbide coating (col 5 line 56 - col 6 line 10). However, there is no disclosure of forming the materials by fusion casting or casting of ingots.

Hajaligol teaches a method of forming carbides, nitrites and borides of titanium, and silicon (col 14 lines 1-30) Materials are melted in a crucible, cast, extruded, rolled, drawn (wrought) and pressed (col 15 line 59 - col 16 line 35).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ the known techniques of fusion casting and extrusion to optimize the microstructure of the material for improved hardness and smoothness (Hadar, col 1 lines 10-15) as well as increase the life of the bonding tool and control surface temperature (Hadar, col 1 lines 48-67).

Allowable Subject Matter

11. Claims 9, 30 and 45 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Iler et al. (USPN 3660050), Pennings (USPN 4020543), Gilding (USPN 3986653), Dworak et al. (USPN 4331048), Haefling et al. (USPN 4691854), Runkle (USPN 5290507), Funari (USPN 4171477), Ellet et al. (USPN 4513190), Nakamura et al. (EPN 0435423A2) and Nakamura et al. (GBN 2287897A).

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynne Edmondson whose telephone number is (703) 306-5699.

LRE

February 14, 2001

Tom Dunn

TOM DUNN
PRIMARY EXAMINER
A.U. 1725